REMARKS

By this Amendment, Applicants have amended claims 4, 6-7, 13, and 17. Claims 4-7, 13, and 15-18 are pending.

Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 4-7, 13, and 15-18 stand rejected under 35 U.S.C. § 112, first paragraph.

More specifically, the Office Action indicates that the specification and claims fail to teach how a reflection type hologram, as recited in claims 4, 6-7, and 13, could "be formed by simply having a light having information of an object, a reference light and a reconstructed image." Claims 4, 6, 7, and 13 have been amended to make clear that the reflection-type hologram is formed by light having information of an object incident on a first hologram dry plate and reference light incident on the first hologram dry plate with an incident optical path different from that of the light having the information of the object. By this amendment, the "hologram recording medium" (i.e., hologram dry plate) is recited in the claims, as requested by the Examiner. Applicants have not, however, amended the claims to recite an "interference effect," because those of ordinary skill in the art clearly understand that in order to form the claimed hologram, an interference effect will occur.

Additionally, the Office Action indicates that the specification and the claims fail to teach how a reflection type hologram could be formed by a reconstructed image of the object (as recited in claims 4, 6, 7, and 13), and further how the reconstructed image of the object is formed. Applicants respectfully disagree, as the formation of the "reconstructed image of the object" is clearly disclosed, for example, at page 29, line 28 through page 30, line 4, of the present specification. In order to clarify this feature, claims 4, 6, 7, and 13 have been amended to recite that the reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram.

Additionally, the Office Action indicates that the feature of a hologram dry plate becoming "the transmission-type hologram upon diffused light having passed through the slit," as included in claim 4, is not disclosed in the

specification. This feature has been omitted from claim 4. Claim 4 has been further amended to recite that the transmission-type hologram is formed by object light incident on a second hologram dry plate, the object light being obtained by irradiating the object that is positioned between a slit and the second hologram dry plate. Further, claim 4 has been amended to recite that the irradiation light used in the formation of the transmission-type hologram is incident on the second hologram dry plate with an incident optical path different from that of the object light. As such, these amendments make clear that a purpose of the second hologram dry plate is to be a hologram recording medium in the formation of the claimed transmission-type hologram.

Additionally, the Office Action indicates that the specification does not disclose how "light having information of an object is obtained by using diffused light diffusing only the width direction of a hologram dry plate," as recited in claim 13. The present specification, at page 43, line 1 through page 44, line 17, makes clear that this feature is directed to the manner of reconstructing the image from the reflection-type hologram, rather than forming the reflection-type hologram, where the length of the opening 22 is elongated in the vertical direction so as to improve the reconstructed image clarity (see Figs. 15A-16B). Thus, claim 13 has been amended to recite that the reconstructed image is displayed by light from the light source which is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram.

Thus, Applicants submit that the claims, as amended, are in full compliance with the requirements of 35 U.S.C. § 112, first paragraph.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 4-7, 13, and 15-18 stand rejected under 35 U.S.C. § 112, second paragraph.

More specifically, the Office Action indicates that claims 4, 6-7 and 13, do not recite essential structural cooperative or logical relationships between the "light having information of an object," the "reference light" and the "reconstructed image." The amendments to claims 4, 6, 7, and 13 described above make clear that the reflection-type hologram is formed by (a) light having

information of an object incident on a first hologram dry plate and (b) reference light incident on the first hologram dry plate with an incident optical path different from that of the light having the information of the object. Further, the reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram. As such, the claims, as amended, clearly recite the structural cooperative and logical relationships.

Additionally, the Office Action indicates that the difference between "reconstructed image" and "reconstructed light" is not clear in claims 4, 6-7, 13, and 17. The feature of "reconstructed light" has been removed from claims 4, 6-7, 13, and 17.

Additionally, the Office Action indicates that claim 13 does not recite the relationship between the "hologram dry plate" and the "reflection-type hologram." As indicated above, claim 13 has been amended to clearly recite that the reflection-type hologram is formed by light having information of an object incident on a hologram dry plate, and by reference light incident on the hologram dry plate. As such, amended claim 13 clearly recites the relationship between the hologram dry plate and the reflection type hologram.

Additionally, the Office Action indicates that the claims as a whole are indefinite. Applicants submit that the claims, as amended, are in full compliance with the requirements of 35 U.S.C. § 112, second paragraph.

Rejections Under 35 U.S.C. §§ 102(b) and 103(a)

Claim 6 stands rejected under 35 U.S.C. § 102(b) "as being anticipated by" Kulick et al. (U.S. Patent No. 5,757,522). Claims 4-5, 7, 13, and 15-18 stand rejected under 35 U.S.C. § 103(a) "as being unpatentable over" Kulick in view of Odhner et al. (U.S. Patent No. 5,613,022). It is respectfully submitted, however, that the claims, as amended, are patentable over Kulick and Odhner for the reasons set forth below.

Kulick discloses a display method for producing a plurality of different views of an object scene simultaneously (See abstract). In Figure 9, Kulick teaches the use of a spatial filter when forming a reflection-type hologram.

Odhner discloses a diffractive display suitable for presenting graphic displays and the like (See abstract).

Applicants' invention, as recited by amended claim 4, includes a feature which is neither disclosed nor suggested by Kulick and Odhner, namely:

> a reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram...

This means that the optical display apparatus recited in claim 4 includes a hologram device and a light source. The hologram device is a reflection-type hologram formed by light having information of an object. A reconstructed image of the object is displayed by light from the light source. The light is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram. This feature is found in the originally filed application at page 43, lines 14-27 (See also Figures 16A-B). No new matter has been added by the amendment of claim 4.

Neither Kulick nor Odhner teach or suggest using such an elongated opening when reconstructing the image from the reflection-type hologram. Particularly, Kulick merely discloses that the secondary hologram 77 of Figure 9 can be illuminated with white light so as to reconstruct the image to the observer as a monochromatic image, which maintains vertical parallax (See Column 4, line 47 through Column 5, line 3). Such an image is not maintained so as not to be blurred over the viewing range, since Kulick does not teach or suggest to use a vertically-elongated opening for reconstruction of the image. Further, Odhner does not make-up for this deficiency in Kulick.

It is because Applicants include the feature of a reconstructed image of the object, displayed by light from the light source that is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram, that the following benefit is achieved. By providing a vertically-elongated opening for the

light source, for reconstructing the image from the reflection-type hologram, the observer is enabled to observe an image of the same color that is not blurred within the viewing range (See page 43, lines 14-27 of the present specification).

Accordingly, for the reasons set forth above, claim 4 is patentable over the art of record.

Independent claims 6, 7, and 13, while not identical to claim 4, include features similar to those recited above with respect to claim 4. Accordingly, claims 6, 7, and 13 are also patentable over the art of record for the reasons set forth above. Claims 5 and 15-18 include all of the features of their respective base claim (either claim 4 or claim 13). Thus, claims 5 and 15-18 are also patentable over the art of record for the reasons set forth above.

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Request for Extension of Time:

In the subject application, it is requested that the shortened period for responding to the Official Action dated May 16, 2002 be extended one month until September 16, 2002. Enclosed is the Patent Application processing fee under 37 C.F.R. § 1.17.

Respectfully Submitted,

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Enclosures:
Version with markings to show changes made
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

CLAIMS:

4. (As Amended) An optical display apparatus, comprising a hologram device and a light source, wherein the hologram device is a reflection-type hologram formed by:

light having information of an object incident on a first hologram dry plate; and

reference light [having] incident on the first hologram dry plate with an incident optical path different from that of the light having the information of the object, wherein

a reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram, and wherein

the light having the information of the object is [reconstructed light] obtained by reconstructing a transmission-type hologram which is formed by: object light incident on a second hologram dry plate, said object light obtained by irradiating the object which is positioned between a slit and [a] the second hologram dry plate [which becomes the transmission-type hologram upon diffused light having passed through the slit]; and irradiation light [having] incident on the second hologram dry plate with an incident optical path different from that of the object light.

6. (As Amended) An optical display apparatus, comprising a hologram device and a light source, wherein the hologram device is a reflection-type hologram formed by:

light having information of an object incident on a hologram dry plate; and

reference light [having] incident on the hologram dry plate with an incident optical path different from that of the light having the information of the object, wherein

a reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram, and wherein

the light having the information of the object is [light which is] obtained by [passing reconstructed light of] reconstructing a transmission-type hologram through a slit [which is arranged to be] adjacent to the transmission-type hologram on which an image of the object is recorded.

7. (As Amended) An optical display apparatus, comprising a hologram device and a light source, wherein the hologram device is a reflection-type hologram formed by:

light having information of an object incident on a hologram dry plate; and

reference light [having] incident on the hologram dry plate with an incident optical path different from that of the light having the information of the object, wherein

a reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram, and wherein

the light having the information of the object [is light which] is obtained by [passing reconstructed light of] reconstructing a transmission-type hologram through[:] a slit having an aperture [which is arranged to be] adjacent to the transmission-type hologram on which an image of the object is recorded; and a cylindrical lens having its generatrix along a longitudinal direction of the aperture of the slit.

13. (As Amended) An optical display apparatus, comprising a hologram device and a light source, wherein the hologram device is a reflection-type hologram formed by:

light having information of an object [which is obtained by using diffused light diffusing in only the width direction of] incident on a hologram dry plate; and

reference light [having] incident on the hologram dry plate with an incident optical path different from that of the light having the information of the object, and wherein

a reconstructed image of the object is displayed by light from the light source which is incident on the reflection-type hologram through an elongated opening arranged such that the light diffuses in only the width direction of the reflection-type hologram.

17. (As Amended) An optical display apparatus according to claim 13, wherein the light having the information of the object is [light which is] obtained by [passing reconstructed light of] reconstructing a transmission-type hologram through a slit [which is arranged to be] adjacent to the transmission-type hologram on which an image of the object is recorded.